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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ADITYO PRAKASH and ENIKO FODOR

Appeal 2016-005953
Application 11/452,125
Technology Center 2400

Before MICHAEL J. STRAUSS, JEREMY J. CURCURI, and JOSEPH P. LENTIVECH, *Administrative Patent Judges*.

CURCURI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–3, 5–10, and 12–18. Claims 4, 11, 19, and 20 are canceled. App. Br. Claims Appendix. We have jurisdiction under 35 U.S.C. § 6(b).

Claims 1–3, 5–10, and 12–18 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1–16 of Prakash (US 7,085,319 B2; Aug. 1, 2006). Final Act. 3.

Claims 1–3, 5–10, and 12–18 are rejected under 35 U.S.C. § 103(a) as obvious over Yokoyama (US 6,005,625; Dec. 21, 1999) and Kondo (US 5,576,772; Nov. 19, 1996). Final Act. 3–10.

We affirm.

STATEMENT OF THE CASE

Appellants' invention relates to compression of video data. Spec. ¶ 2. Claim 1 is illustrative and reproduced below, with the key disputed limitations emphasized:

1. An apparatus for encoding uncompressed video data to form compressed video data, wherein the video data comprises a plurality of image frames including a set of reference frames and a set of nonkey frames, wherein the set of nonkey frames are encoded with reference at least to a segmentation of at least one of the image frames in the set of reference frames, and further wherein the segmentation is an assignment of some or all of the pixels of the reference frame to at least one segment based on at least one of a color value or a location of the pixels in the reference frame, the apparatus comprising:

a frame compressor configured to encode a first reference frame;

a segmenter configured to segment the first reference frame into a first set of segments, a second set of segments, and a third set of segments, wherein the first set, the second set, and the third set form a hierarchy of segments and each segment encloses a simply connected set of pixels of the first reference frame, wherein segments of the second set of segments are formed by grouping segments of the first set of segments, and wherein segments of the third set of segments are formed by grouping segments of the second set of segments;

a matcher configured to match segments of the hierarchy of segments to pixels of a nonkey frame so as to generate a hierarchy of motion vectors; and

an output scheduler configured to encode into the compressed video data a representation of the nonkey frame according to motion vectors from the matcher.

ANALYSIS

THE OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION OF CLAIMS 1–3, 5–10, AND 12–18

The Examiner finds claims 1–3, 5–10, and 12–18 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1–16 of Prakash. Final Act. 3.

Appellants do not present arguments with respect to this ground of rejection. *See* App. Br. 7–11, Reply Br. 2–4.

We, therefore, sustain the Examiner's obviousness-type double patenting rejection of claims 1–3, 5–10, and 12–18.

THE OBVIOUSNESS REJECTION OF CLAIMS 1–3, 5–10, AND 12–18 OVER YOKOYAMA AND KONDO

The Examiner finds Yokoyama and Kondo teach all limitations of claim 1. Final Act. 3–5. The Examiner finds Yokoyama teaches all limitations of claim 1, except for the recited segmenter, for which the Examiner relies on Kondo. Final Act. 5 (citing Kondo Figs. 9A–9C); *see also* Ans. 12–14. The Examiner reasons:

> [I]t would have been obvious to one of ordinary skill in the art to modify the teachings of Kondo into the encoding system of Yokoyam[a] to provide an improved method capable of precisely detecting motion vectors from two successive video frames through the use of a hierarchical motion estimation approach and encoding the picture quality.

Final Act. 5.

Appellants present the following principal arguments:

i.

> Figs. 9A-9C of Kondo do[] not teach or suggest the claimed hierarchy of segments. Rather, they teach a hierarchy of resolutions of motion vectors. As explained by Kondo, "The resolution or accuracy of motion vectors detected differs in each hierarchical stage. In this example, the resolution of the third hierarchical stage motion vector is four pixels in the horizontal direction and four lines in the vertical direction. The resolution of the second hierarchical stage motion vector is two pixels in the horizontal direction and two lines in the vertical direction. The resolution of the first hierarchical stage motion vector is one

> pixel in the horizontal direction and one line in the vertical direction." (Emphasis added.)
>
> Hence, Kondo teaches a hierarchy of resolutions, not the claimed **hierarchy of segments**. Appellant respectfully submits that a hierarchy of image segments and a hierarchy image resolutions are *substantially different in function, structure and use*. For at least this reason, the rejection of claim 1 should be reversed.

App. Br. 9; *see also* Reply Br. 3–4.

ii. "[T]he motion estimator 13 [(Yokoyama)] does not use a **hierarchy of segments** to generate a **hierarchy of motion vectors**." App. Br. 10.

We are persuaded by Appellants that the Examiner erred in finding Yokoyama and Kondo teach the key disputed limitations.

Regarding Appellants' argument (i), the key disputed limitations in claim 1 recite a hierarchy of segments. *See* claim 1. Kondo discloses: "FIGS. 9A-9C are diagrams illustrating the values representing a block in the first, second and third hierarchical stages, respectively, of production of a motion vector according to the present invention[.]" Kondo col. 6, ll. 16–19; *see also* Kondo col. 8, l. 13 – col. 9, l. 57 (motion vector detection in a multi-stage operation) *and* Kondo Abstract ("Using a multi-stage operation, a motion vector is detected between a base block in a present frame and the best matching position of an inspection block in a reference frame.").

In short, we agree with Appellants. Although Kondo's Figs. 9A–9C illustrate hierarchical stages, Kondo discloses resolving *a* motion vector between *a* base block and *an* inspection block. Kondo col. 8, l. 13 – col. 9, l. 57. Kondo discloses a hierarchy of resolutions for the motion vector —

Kondo does not disclose a hierarchy of segments (and also does not disclose a hierarchy of motion vectors). *See id.*

Regarding Appellants' argument (ii), we agree with Appellants that motion estimator 13 in Yokoyoma does not generate a hierarchy of motion vectors because Yokoyama and Kondo, singly or in combination, do not teach the recited hierarchy of segments.

We, therefore, do not sustain the Examiner's obviousness rejection of claim 1, or of claims 2, 3, 5–7, and 12–16, which depend from claim 1.

Independent claim 8 recites:

> a segmenter configured to segment the first reference frame into a first set of segments, a second set of segments, and a third set of segments, wherein the first set, the second set, and the third set form a hierarchy of segments and each segment encloses a simply connected set of pixels of the first reference frame, wherein the segmenter is further configured to divide segments from the first set of segments to form the second set of segments, and divide segments from the second set of segments to form the third set of segments;
>
> a matcher configured to match segments of the hierarchy of segments to pixels of a nonkey frame so as to generate a hierarchy of motion vectors[.]

These limitations of claim 8 are similar to the key disputed limitations of claim 1. For the same reasons as discussed above, we also do not sustain the Examiner's obviousness rejection of claim 8, or of claims 9 and 10, which depend from claim 8.

Independent claim 17 recites:

> means for segmenting the first reference frame into a first set of segments;
>
> means for grouping segments of the first set of segments to form a second set of segments;

> means for grouping segments of the second set of segments to form a third set of segments, wherein the first set, the second set, and the third segment form a hierarchy of segments and each segment encloses a simply connected set of pixels of the first reference frame;
>
> means for matching segments of the hierarchy of segments to pixels of a nonkey frame so as to generate a hierarchy of motion vectors[.]

These limitations of claim 17 are similar to the key disputed limitations of claim 1, and correspond to segmenter 220 and motion matcher 206 in Fig. 2 (encoder). For the same reasons as discussed above, we also do not sustain the Examiner's obviousness rejection of claim 17, or of claim 18, which depends from claim 17.

CONCLUSION

We sustain the Examiner's obviousness-type double patenting rejection of claims 1–3, 5–10, and 12–18.

We do not sustain the Examiner's rejection of claims 1–3, 5–10, and 12–18 under 35 U.S.C. § 103(a).

Since at least one rejection encompassing all claims on appeal is sustained, the decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED